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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

Report Date: October 24, 2017 11:48

Project: Solvay

Account #: 20003
Group Number: 1857078
State of Sample Origin: NJ

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Electronic Copy To	Solvay	Attn: Mitch Gertz
Electronic Copy To	Solvay	Attn: Mark Christensen
Electronic Copy To	Integral Consulting Inc.	Attn: Erin Palko
Electronic Copy To	Integral Consulting Inc.	Attn: Craig Hutchings

Respectfully Submitted,

Bonnie Stadelmann

Bonnie Stadelmann
Senior Project Manager

(312) 590-3133

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
V-915 Grab Water	09/21/2017 15:00	9238512
Field Blank Grab Water	09/21/2017 15:00	9238513

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **V-915 Grab Water**
Solvay

Project Name: **Solvay**

Submittal Date/Time: 09/29/2017 09:35
Collection Date/Time: 09/21/2017 15:00

Integral Consulting Inc.
ELLE Sample #: WW 9238512
ELLE Group #: 1857078
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	**EPA 537 Version 1.1 Modified**		**ng/l**		**ng/l**	**ng/l**	
10954	Perfluorobutanesulfonate	375-73-5	N.D.		0.8	3	1
10954	Perfluorodecanoic acid	335-76-2	3		0.5	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.		0.5	2	1
10954	Perfluoroheptanoic acid	375-85-9	6		0.5	2	1
10954	Perfluorohexanesulfonate	355-46-4	2	J	1	3	1
10954	Perfluorohexanoic acid	307-24-4	3		0.6	2	1
10954	Perfluorononanoic acid	375-95-1	480		0.6	2	1
10954	Perfluoro-octanesulfonate	1763-23-1	4	J	2	6	1
10954	Perfluorooctanoic acid	335-67-1	62		0.6	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.		0.5	2	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.		0.5	2	1
10954	Perfluoroundecanoic acid	2058-94-8	16		1	3	1

The recovery of 13C3-PFBS is outside of QC acceptance limits as noted on the QC Summary for both the sample and its Matrix Spike, confirming a matrix effect.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	17274002	10/16/2017 14:58	Devon M Whooley	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	17274002	10/02/2017 08:40	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

Sample Description: **Field Blank Grab Water**
Solvay

Project Name: **Solvay**

Submittal Date/Time: 09/29/2017 09:35
Collection Date/Time: 09/21/2017 15:00

Integral Consulting Inc.
ELLE Sample #: WW 9238513
ELLE Group #: 1857078
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
10954	Perfluorobutanesulfonate	375-73-5	N.D.	0.8	3	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	0.5	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	0.5	2	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	0.5	2	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	1	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	0.6	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	0.6	2	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	2	6	1
10954	Perfluorooctanoic acid	335-67-1	0.9 J	0.6	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	0.5	2	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	0.5	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	1	3	1

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	17274002	10/16/2017 15:19	Devon M Whooley	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	17274002	10/02/2017 08:40	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1857078
Reported: 10/24/2017 11:48

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 17274002	Sample number(s): 9238512-9238513		
Perfluorobutanesulfonate	N.D.	0.8	3
Perfluorodecanoic acid	N.D.	0.5	2
Perfluorododecanoic acid	N.D.	0.5	2
Perfluoroheptanoic acid	N.D.	0.5	2
Perfluorohexanesulfonate	N.D.	1	3
Perfluorohexanoic acid	N.D.	0.6	2
Perfluorononanoic acid	N.D.	0.6	2
Perfluoro-octanesulfonate	N.D.	2	6
Perfluorooctanoic acid	N.D.	0.6	2
Perfluorotetradecanoic acid	N.D.	0.5	2
Perfluorotridecanoic acid	N.D.	0.5	2
Perfluoroundecanoic acid	N.D.	1	3

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 17274002	Sample number(s): 9238512-9238513								
Perfluorobutanesulfonate	12.03	10.12	12.03	10.39	84	86	70-130	3	30
Perfluorodecanoic acid	13.6	11.01	13.6	11.83	81	87	70-130	7	30
Perfluorododecanoic acid	13.6	10.79	13.6	13.12	79	96	70-130	19	30
Perfluoroheptanoic acid	13.6	10.74	13.6	11.74	79	86	70-130	9	30
Perfluorohexanesulfonate	12.86	9.55	12.86	10.38	74	81	70-130	8	30
Perfluorohexanoic acid	13.6	11.27	13.6	11.75	83	86	70-130	4	30
Perfluorononanoic acid	13.6	14.18	13.6	13.84	104	102	70-130	2	30
Perfluoro-octanesulfonate	13	10.99	13	11.92	85	92	70-130	8	30
Perfluorooctanoic acid	13.6	12.35	13.6	10.3	91	76	70-130	18	30
Perfluorotetradecanoic acid	13.6	11.55	13.6	12.4	85	91	70-130	7	30
Perfluorotridecanoic acid	13.6	10.55	13.6	11.57	78	85	70-130	9	30
Perfluoroundecanoic acid	13.6	11.29	13.6	11.55	83	85	70-130	2	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1857078
Reported: 10/24/2017 11:48

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/l	MS Spike Added ng/l	MS Conc ng/l	MSD Spike Added ng/l	MSD Conc ng/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 17274002	Sample number(s): 9238512-9238513 UNSPK: 9238512									
Perfluorobutanesulfonate	N.D.	11.98	11.33			95		70-130		
Perfluorodecanoic acid	3.46	13.54	15.42			88		70-130		
Perfluorododecanoic acid	N.D.	13.54	12.13			90		70-130		
Perfluoroheptanoic acid	6.08	13.54	18.16			89		70-130		
Perfluorohexanesulfonate	2.03	12.81	11.74			76		70-130		
Perfluorohexanoic acid	3.49	13.54	14.07			78		70-130		
Perfluorononanoic acid	477.64	13.54	424.58			-391 (2)		70-130		
Perfluoro-octanesulfonate	3.82	12.95	15.08			87		70-130		
Perfluorooctanoic acid	61.91	13.54	82.42			151 (2)		70-130		
Perfluorotetradecanoic acid	N.D.	13.54	12.16			90		70-130		
Perfluorotridecanoic acid	N.D.	13.54	11.92			88		70-130		
Perfluoroundecanoic acid	16.17	13.54	30.82			108		70-130		

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 17274002

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9238512	175*	79	85	94	96	92
9238513	91	107	101	106	112	103
Blank	89	91	81	87	102	89
LCS	113	119	121	117	122*	118*
LCSD	94	90	89	88	104	102
MS	164*	83	92	95	90	101
Limits:	26-148	31-128	34-126	35-126	43-112	43-115

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
9238512	93	101	100	108	83
9238513	104	113	105	100	86
Blank	96	96	102	92	92
LCS	115	109	104	107	91
LCSD	90	101	104	93	86
MS	109	93	86	98	82

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1857078
Reported: 10/24/2017 11:48

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 17274002

Limits:	32-134	40-115	30-128	28-127	26-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 26003 Group # 1857078 Sample # 923852-13

COC # 532868

Client Information

Client: Solvay	Acct. #:
Project Name/#:	PWSID #:
Project Manager:	P.O. #:
Sampler: Mark Christensen	Quote #:
State where samples were collected: NJ	For Compliance: Yes ☑ No ☐

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☐ Surface ☐ NPDES ☒ | Other: ____

Analysis Requested

Preservation Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAA by LC/MS/MS	O
V-915	9/21/17	1500	X		2	X	X
Field Blank	9/21/17	1500	X		1	X	

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

O = Trizma

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: 10/26/2017

E-mail address: mark.christensen@solvay.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
[illegible]	9/28/17	1400			
Relinquished by	Date	Time	Received by	Date	Time
Relinquished by	Date	Time	Received by	Date	Time
Relinquished by	Date	Time	Received by	Date	Time
Relinquished by	Date	Time	Received by	Date	Time
				9/29/17	0935

EDD Required? Yes (No)

If yes, format: _____

Site-Specific QC (MS/MSD/Dup)? Yes (No)

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:

UPS _____ FedEx ✓ Other _____

Temperature upon receipt 2.0 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 195894

Group Number(s): 1857078

Client: SOLVAY

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	09/29/2017 9:35
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NJ		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Nicole Reiff (25684) at 14:23 on 09/29/2017

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	2.0	DT	Wet	N	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	non-detect
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.